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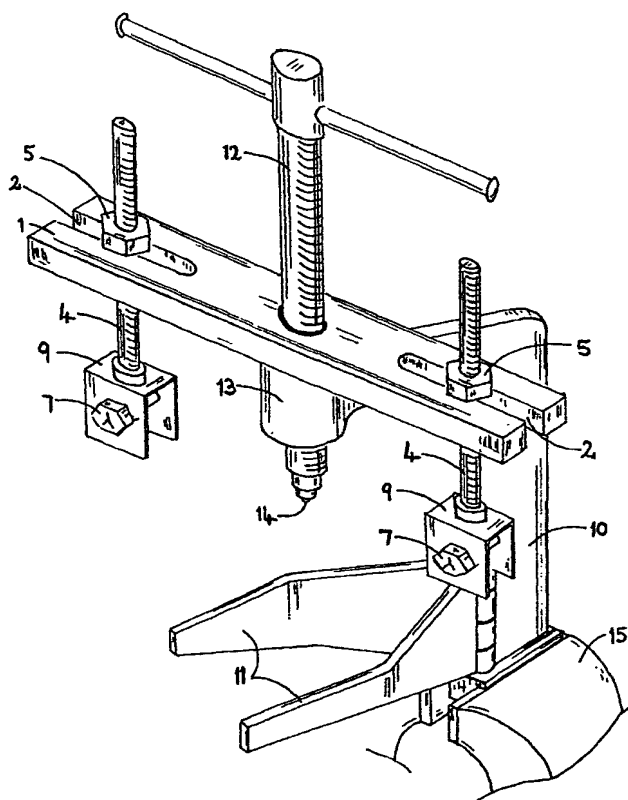
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: BEARING PRESS SUPPORT ADAPTOR



(57) Abstract: A support adaptor assembly for a bearing press comprising a rectangular shaped header plate (1), a pair of adjustable support rods (4) each with an adaptor (9) on one end for providing a means of supporting an object (50) to be worked on with a bearing press either above or below the support members of the bearing press.

BEARING PRESS SUPPORT ADAPTOR

BACKGROUND OF THE INVENTION

This invention relates to a device (hereinafter referred to as a "support adaptor assembly") which can be fitted to a pressing device (hereinafter referred to as a "bearing press") used for removing or for fitting press-fitted components such as bearings, gears, pulleys, pins, bushes and seals.

Conventional bearing presses comprise a support frame having a base section, two spaced apart elongate side members extending upwards from the base section, and a fixed mounting member to which is connected a mechanically or hydraulically operated pressing device. Attached to the elongate side members of the support frame by pins or bolts, are two parallel, horizontal, spaced apart support members used to support a component to which pressure is applied by operation of the pressing device.

There are many variations of this configuration, but all known prior art bearing presses have two parallel, horizontal, spaced apart support members, above which is mounted a pressing device.

In use, an object requiring assembly or dismantling of press-fitted components, is placed on the support members of the bearing press, or on plates supported by the support members of the bearing press, so that the pressing device can be operated to apply vertical, downward pressure on the object to remove or replace the press fitted components. In order to prevent damage to components and injury to the operator of the bearing press, the component to which pressure is applied must be on a horizontal plane relative to the vertical direction of the downward pressing force.

There are, however, some objects with press-fitted components, which cannot be correctly aligned with a horizontal plane or supported on the support members of a bearing press for the following reasons:

- a) the object may be too long to fit between the pressing device and the horizontal support members of the bearing press. Even when the support members have a means of height adjustment, this is often a difficult and time consuming process;
- b) the object may be too wide to fit between the horizontal support members of the bearing press;

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- c) the object may be of an irregular shape which does not allow it to be supported in such a way that places the component to be fitted or removed with a horizontal plane relative to the vertical direction of the downward pressing force;
- d) the object may comprise two components of similar width or diameter which are press fitted together and must be separated by use of a pressing force for repairs.

OBJECT OF THE INVENTION

It is the object of the present invention to reduce the disadvantages of bearing presses as described above, by providing a means by which objects with press-fitted components can be supported in suspension above or below the horizontal support members of the bearing press.

STATEMENT OF THE INVENTION

According to the present invention, there is provided a support adaptor assembly which can be fitted to a bearing press into which objects requiring removal or installation of press-fitted components, such as bearings, can be placed and supported whilst pressure is applied from the pressing device. Said support adaptor assembly providing a means for supporting objects in suspension above or below the support members of the bearing press.

It is preferred that the support adaptor assembly include a rectangular header plate which includes a means for mounting it centrally either on the frame of the bearing press above the pressing device or on the pressing device itself where the pressing device includes a means of mounting it.

It is preferred that the rectangular header plate contain a slot in either end to enable a pair of elongate support rods to be vertically attached to the support plate by means of nuts above and below the header plate in a manner which allows adjustment of the width by which the support rods are spaced apart.

It is preferred that the two support rods have a means of adjustment of the length by which they extend below the rectangular header plate.

It is preferred that each support rods have a means for mounting an adaptor which provides a means for supporting an object with press-fitted components which requires use of a bearing press for assembly or

dismantling, but cannot be supported on the support members of the bearing press.

According to the present invention, there is also provided in combination, the above described support adaptor assembly and bearing press.

The present invention can be embodied in many ways without departing from the spirit and scope described above.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG 1 is a perspective view of a small portable bearing press mounted in a vice.

FIG 2 is a perspective view of the preferred embodiment of the support adaptor assembly.

FIG 3 is a perspective view of the preferred embodiment of the support adaptor assembly mounted on a small portable bearing press.

FIG 4 is a front elevational view of the preferred embodiment of the support adaptor assembly mounted on a small portable bearing press showing an object comprising two press fitted components mounted on the support adaptor assembly.

FIG 5 is a front elevational view of the preferred embodiment of the support adaptor assembly mounted on a small portable bearing press showing one component of an object mounted on the support adaptor assembly and another component of the object supported on the support members of the bearing press.

DETAILED DESCRIPTION OF THE INVENTION

The preferred embodiment of the support adaptor assembly shown in **FIGS 2, 3, 4** and **5** is adapted to be used with a bearing press such as is shown in **FIG 1** for working on an object, generally identified by the number **50** in **FIG 4** which comprises two main press-fitted components referred to hereafter as the inner component **51** and the outer component **52**. Said bearing press being mountable in a vice **15** and comprising an upright frame **10**, a vertical screw pressing shaft **12**, a threaded shaft mounting **13** and two support arms **11** having a horizontal plane along and across the top edges relative to the vertical pressing shaft **12**. In general terms the support adaptor assembly, shown in **FIGS 2, 3, 4** and **5**, includes a header plate **1** and two elongate support rods **4** and an adaptor **9** mounted on

one end of each rod **4** which together provide a means for supporting an object **50** to be worked on and shown in **FIGS 4** and **5**.

With reference to **FIG 2**, the preferred embodiment of the support adaptor assembly is shown as comprising a rectangular header plate **1** through which is formed a centrally located clear hole **3** and a slot **2** formed in each end. Mounted on the header plate **1**, through the slots **2** provided in each end, are a pair of elongate threaded support rods **4** secured to the header plate **1** by nuts **5** and **6** tightened against both flat surfaces of the header plate **1**. At the opposite end of each support rod **4**, is attached a screw mounted stirrup shaped adaptor **9** through either side of which is located a bolt **7** with a nut on one end **8**.

The preferred embodiment of the present invention is shown in **FIG 2** comprising a header plate **1** through which is formed a centrally located hole **3** which provides a means for the header plate **1** to be centrally mounted on the bearing press frame as shown in **FIGS 3, 4** and **5**. In order to mount the support adaptor assembly on to the bearing press shown at **FIG 1**, the pressing shaft **12** is first screwed out of the threaded shaft mounting **13** and the header plate **1** of the support adaptor assembly is placed onto the top edge of the bearing press frame **10** and threaded shaft mounting **13** in a position whereby the hole **3** in the header plate **1** is in alignment with the hole of the threaded shaft mounting **13**. In this position, the pressing shaft **12** is passed through the clear hole **3** in the header plate **1** and screwed into the threaded mounting **13** until the tip **14** of the pressing shaft **12** protrudes through the threaded mounting **13** as shown in **FIG 3**.

In use, with the support adaptor assembly mounted on the bearing press, an object to be worked on can be supported by using adaptors screw fitted to the support rods **4**.

In **FIG 4** an object **50** is shown supported by the support adaptor assembly so that the press-fitted components **51** and **52** of the object **50** can be separated by use of the pressing shaft **12** of the bearing press. In this case, the inner component **51** has a hole at points **A, B** and **C** and two of these, at points **B** and **C** respectively, have been utilised to support the inner component **51** by first aligning those holes with holes provided in the stirrup shaped adaptors **9** mounted on the support rods **4**. This can be done by adjusting the length by which each support rod **4** extends below the header plate **1** and by adjusting the width by which the support rods **4** are spaced apart. With reference to **FIGS 3** and **4**, there is provided in the header plate **1** a slot **2** in each end as a means of adjustment of the width by which the support rods **4** can be spaced apart or otherwise positioned relative to the header plate **1**. In use, the nuts **6** on the support rods **4**

located below the header plate 1 are loosened so that the support rods 4 can be free to be moved along the slots 2 provided in the header plate 1 until they are located in the desired position whereupon the nuts 6 on the support rods 4 may be tightened against the lower surface of the header plate 1 to secure the support rods 4 in position. The length by which the support rods 4 extend below the header plate 1 may also be adjusted by relocating the nuts 5 and 6 provided on the support rods 4 above and below the header plate 1 respectively. To increase the length by which a support rod 4 extends below the header plate 1, the nut 5 above the header plate is wound upwards along the support rod 4 until the desired length is attained whereupon the nut 6 below the header plate 1 is tightened against the lower surface of the header plate 1 to secure the support rod 4 in position. To decrease the length by which a support rod 4 extends below the header plate 1, the nut 6 on the support rod 4 below the header plate 1 is wound downwards along the support rod 4 until the desired length has been obtained and the nut 5 on the support rod 4 above the header plate 1 is then wound downwards along the support rod 4 and tightened against the upper surface of the header plate 1 to secure the support rod 4 in position.

When the support rods 4 have been adjusted to allow alignment of the holes in the sides of the stirrup shaped adaptors 9 mounted on the support rods 4 with the holes in the component 51 at points B and C, a bolt 7 is passed through each stirrup shaped adaptor 9 and the component 51 to mount the object 50 in the bearing press. A nut may be wound onto the bolt and tightened against the side of the stirrup shaped adaptor 9 to secure the object 50 in place. Further minor adjustment of the length by which the support rods 4 extend below the header plate, 1 or the width by which the support rods 4 are spaced apart, or otherwise positioned relative to the header plate, 1 may be necessary to locate the point 16, shown in FIG 4, to which pressure needs to be applied with the tip 14 of the pressing shaft 12 centrally below the tip 14 of the pressing shaft 12 and on a horizontal plane relative to the vertical direction of the pressing force represented by the vertical alignment of the pressing shaft 12.

The pressing shaft 12 then is wound downwards to apply a downward pressing force to the outer component 52 of the object which is shown in FIG 5 separated from the inner component 51 and supported on the support members 11 of the bearing press. The outer component 52 remains mounted on the support adaptor assembly, and can be unattached by removing the bolts 7 from the stirrup shaped adaptors 9.

The above described invention thus overcomes a major disadvantage of bearing presses by providing a means of allowing the assembly and dismantling of many press fitted components which cannot be supported

on the support members of bearing presses. The preferred embodiment described above has been designed for use with a small portable bearing press as shown in **FIG 1** which has a screw shaft pressing device **12**. However, it can be easily modified to be mounted on most bearing presses without departing from the spirit and scope of the invention. Similarly, the preferred embodiment of the invention has been designed with stirrup shaped adaptors **9** mounted on support rods **4** shown in **FIG 2**, to provide a means for supporting the object **50** shown in **FIGS 4** and **5**. However, other adaptors can be designed and mounted on the threaded support rods **4**, or other devices such as chains and shackles, to suit various types of objects which require the use of the support adaptor assembly for press fitting or removing components, without departing from the spirit and scope of the invention.

CLAIMS:

1. A support adaptor assembly which can be mounted onto a bearing press into which objects requiring assembly or dismantling of press fitted components such as bearings can be placed and supported whilst pressure is applied from the pressing device; said support adaptor assembly including a means for supporting objects in suspension either above or below the support members of the bearing press.
2. The support adaptor assembly defined in claim 1 includes a rectangular shaped header plate with a centrally located hole providing a means that enables it to be horizontally mounted centrally above, or centrally on the pressing device of a bearing press and which includes a slot in either end.
3. The support adaptor assembly defined in claims 1 and 2 includes two support rods, each being fitted to the header plate by utilising the slots provided in either end of the header plate, and extending downwards relative to the direction of the pressing force of the pressing device and including a means for adjusting the length by which the rods extend below the header plate.
4. The support adaptor assembly defined in claims 1, 2 and 3 wherein the two support rods include a means that enables a component support adaptor to be fitted onto each one at the lower end.
5. The support adaptor assembly defined in claims 1, 2, 3 and 4 wherein the component support adaptors fitted to the lower end of each support rod comprise a stirrup shaped device including a means for attaching a component to be worked on in the bearing press.
6. In combination, a bearing press and the support adaptor assembly defined in any one of the preceding claims coupled to the bearing press.

AMENDED CLAIMS

[received by the International Bureau on 08 July 2003 (08.07.03);
original claims 1 and 2 amended; claims 3 to 6 unchanged (1 page)]

1. A support adaptor assembly which can be mounted onto a bearing press into which objects requiring assembly or dismantling of press fitted components such as bearings can be placed and supported whilst pressure is applied from the pressing device; said support adaptor assembly including a means for supporting objects in suspension above the support members of the bearing press.
2. The support adaptor assembly defined in claim 1 includes an elongate rectangular shaped header plate with a slot in either end and a centrally located hole providing a means that enables said header plate to be horizontally mounted on the top section of a bearing press in a horizontally central position relative to the vertical direction of the pressing force applied by the pressing shaft of the pressing device.
3. The support adaptor assembly defined in claims 1 and 2 includes two support rods, each being fitted to the header plate by utilising the slots provided in either end of the header plate, and extending downwards relative to the direction of the pressing force of the pressing device and including a means for adjusting the length by which the rods extend below the header plate.
4. The support adaptor assembly defined in claims 1, 2 and 3 wherein the two support rods include a means that enables a component support adaptor to be fitted onto each one at the lower end.
5. The support adaptor assembly defined in claims 1, 2, 3 and 4 wherein the component support adaptors fitted to the lower end of each support rod comprise a stirrup shaped device including a means for attaching a component to be worked on in the bearing press.
6. In combination, a bearing press and the support adaptor assembly defined in any one of the preceding claims coupled to the bearing press.

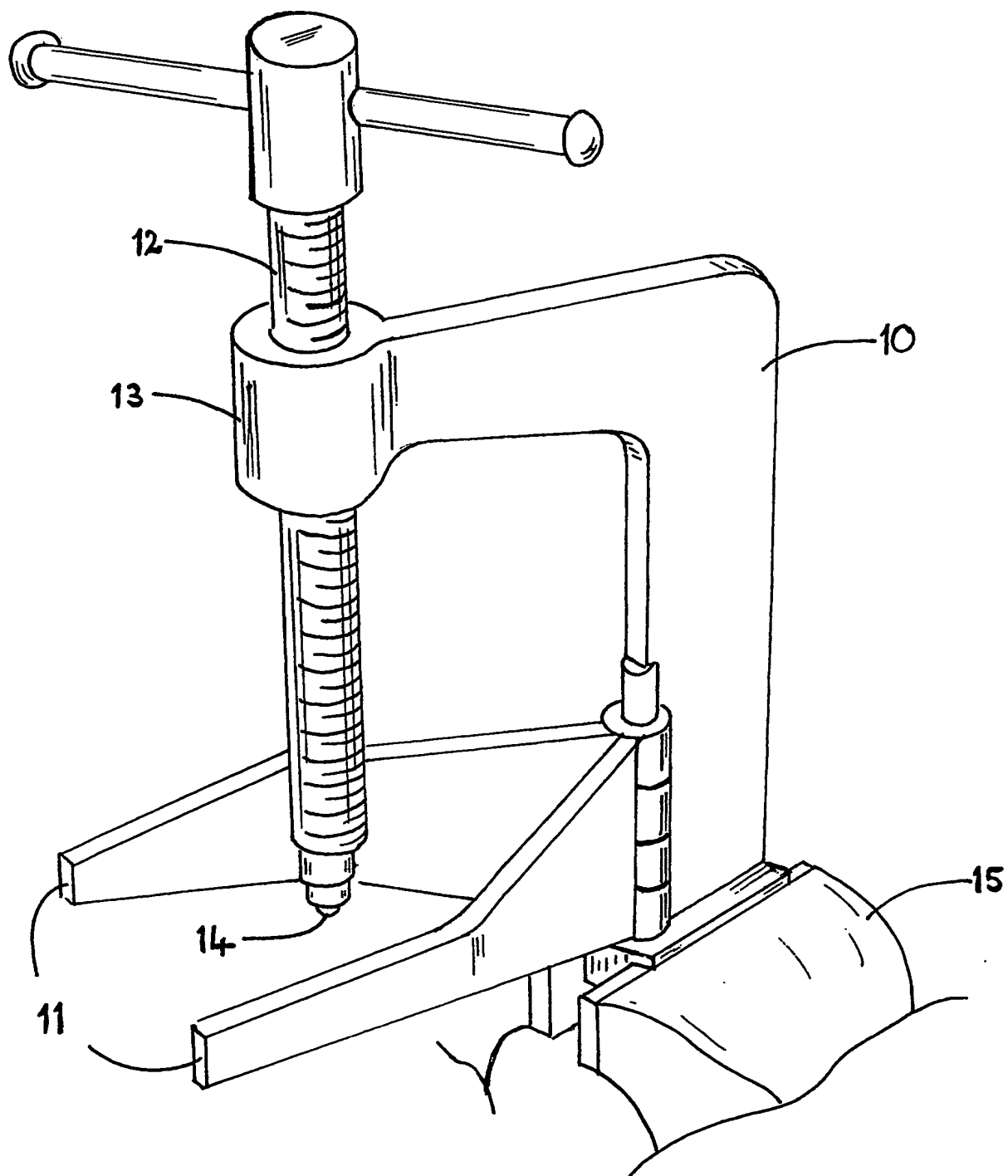


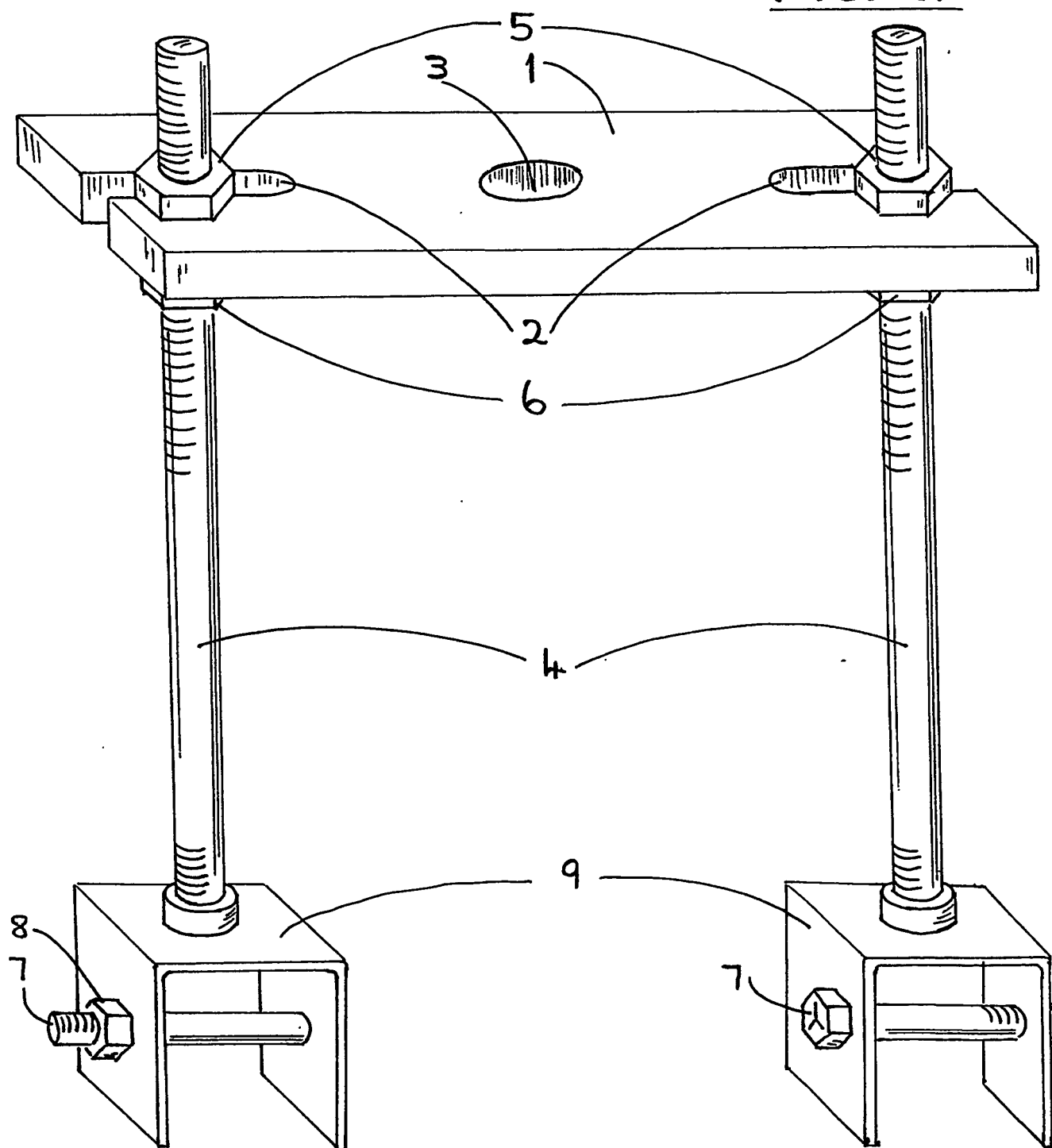
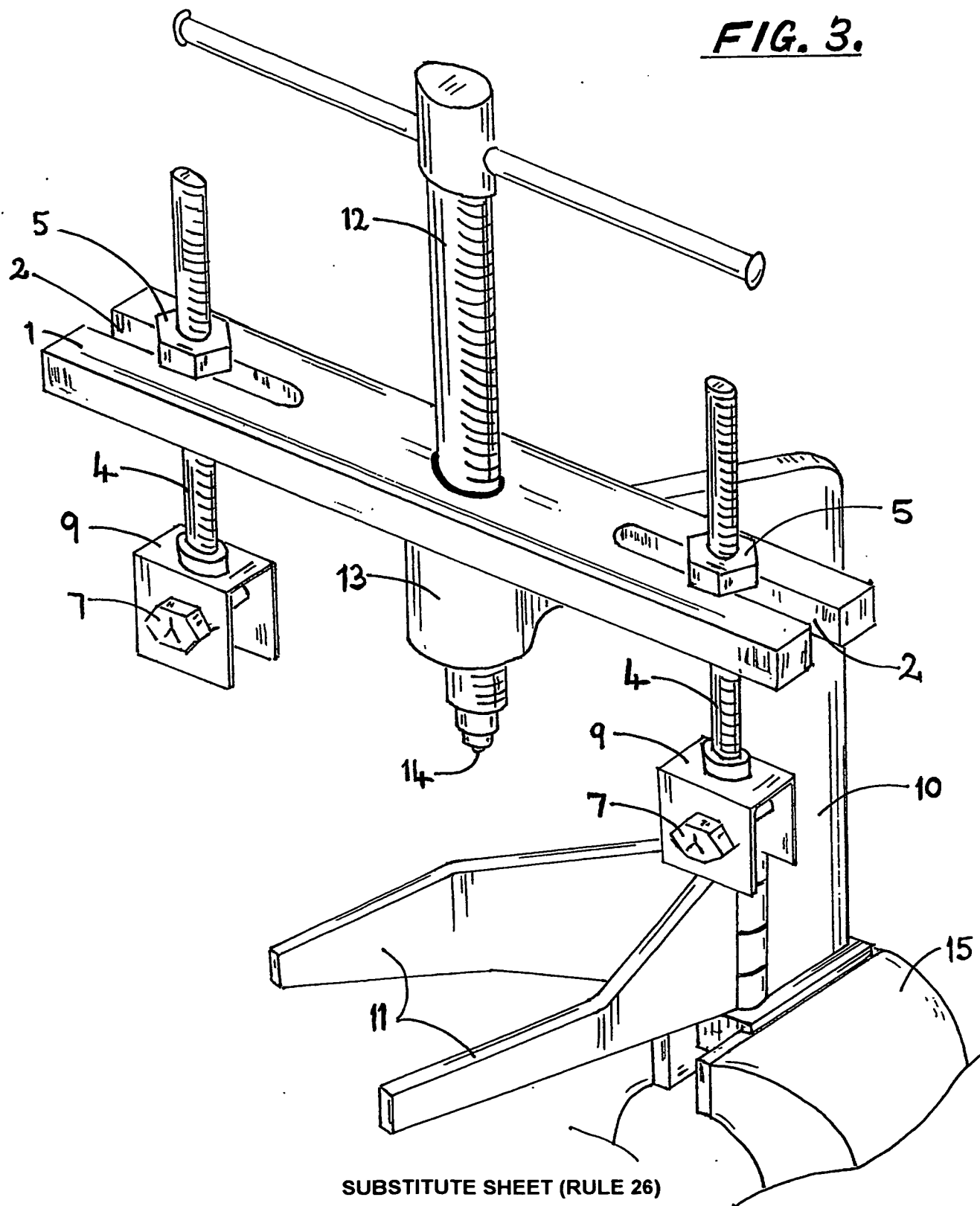
FIG. 2.

FIG. 3.



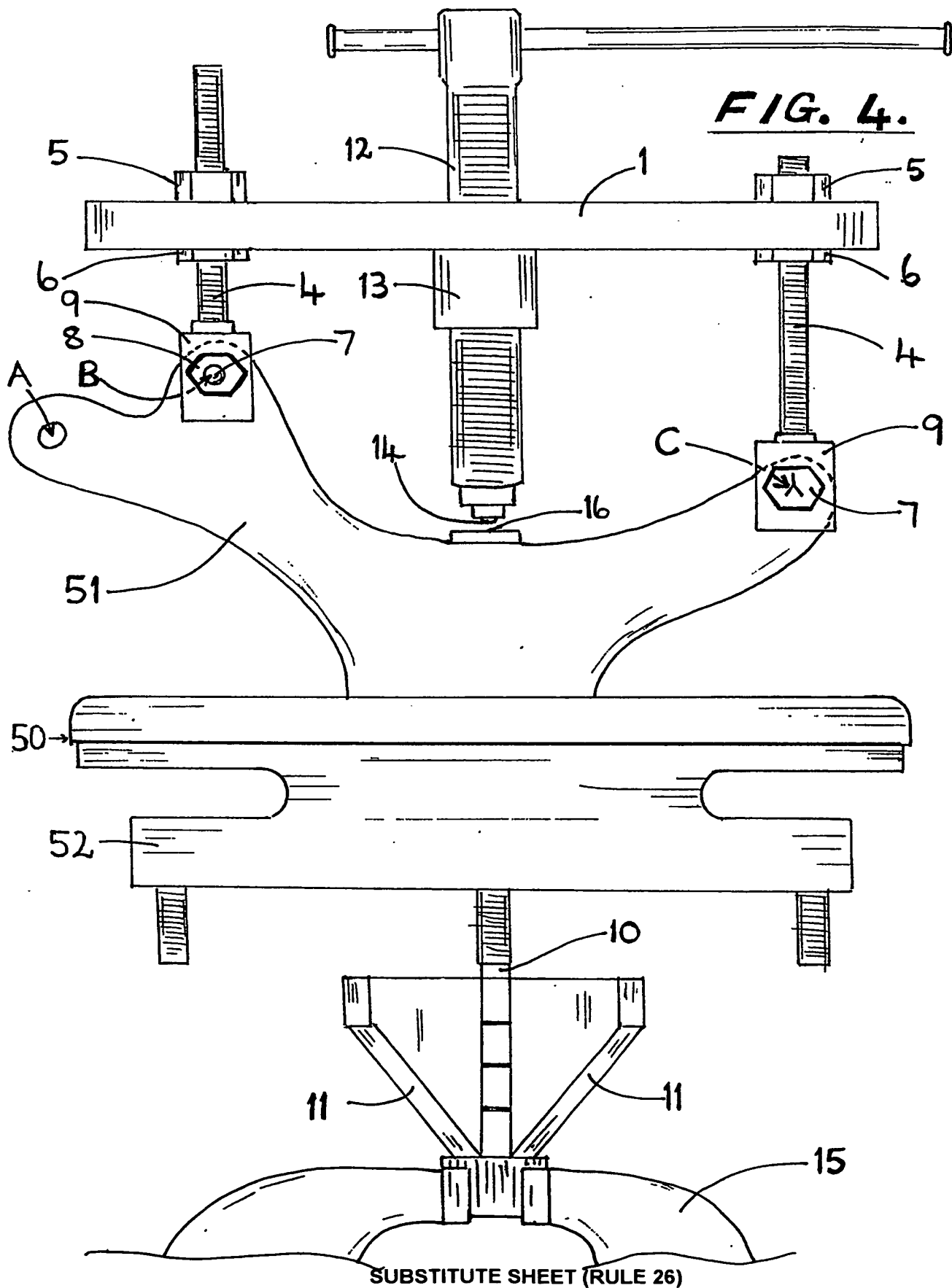
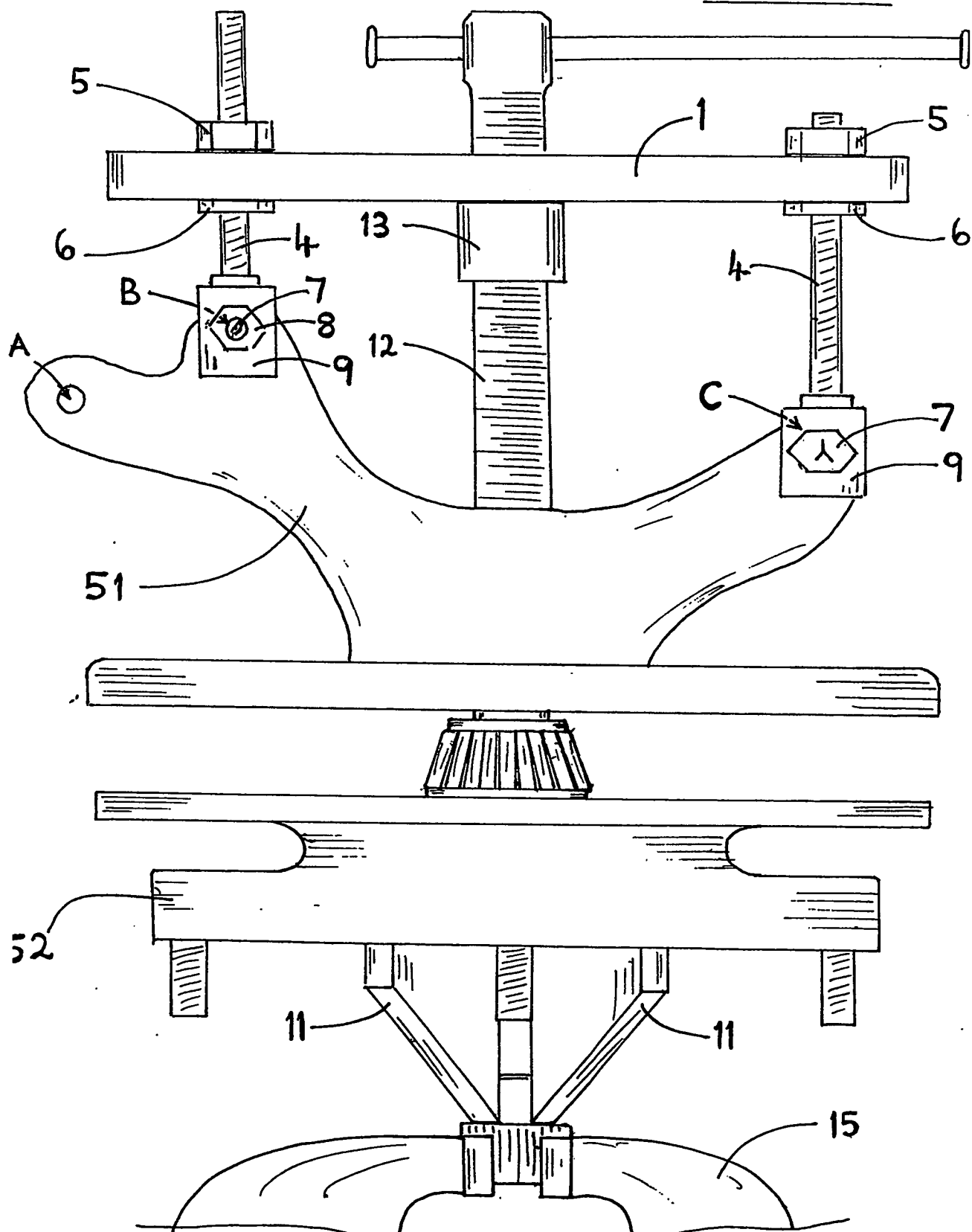


FIG. 5.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU03/00338

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: B30B 1/18, 1/20, 15/04 F16M 13/00 F16C 43/00 B25B 27/06 B23P 19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B30B 1/18, 1/20, 15/04 F16M 13/00 F16C 43/00 B25B 27/06 B23P 19/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPAT key words BEARING and (SUPPORT+ or ADAPTER) and (ASSEMBL+ or DISMANTL+ or DISASSEMBL+)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AU 200035386 B (STORAY C F et al.) 23 November 2000 Whole document	1-6
X	GB 2308566 A (DANA CORPORATION) 2 July 1997 Whole document	1-6
A	EP 428462 A (A.T.R ADVANCED TECHNOLOGY RESEARCH S.A) 22 May 1991 Whole document	1-6



Further documents are listed in the continuation of Box C



See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
8 May 2003

Date of mailing of the international search report
13 MAY 2003

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Information on patent family members

PCT/AU03/00338

Patent Document Cited in Search Report			Patent Family Member				
AU	200035386 B	NONE					
GB	2308566 A	AU	76489/96 A	BR	9606148 A	CA	2193570 A
		DE	19654235 A	FR	2742690 A	US	5836078 A
EP	428462 A	AU	66585/90 A	BR	9005784 A	CA	2029735 A
		CZ	9005630 A	FR	2654479 A	IE	904110 A
		IE	904111 A	JP	3186613 A	SU	1799320 A
END OF ANNEX							

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 28 JAN 2004

WIPO PCT

Applicant's or agent's file reference THOMSON	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU03/00338	International Filing Date (day/month/year) 20 March 2003	Priority Date (day/month/year) 26 April 2002
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ B30B 1/18, 1/20, 15/04 F16M 13/00 F16C 43/00 B25B 27/06 B23P19/00		
Applicant THOMSON, David John		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 24 November 2003	Date of completion of the report 12 December 2003
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer SARAVANAMUTHU PONNAMPALAM Telephone No. (02) 6283 2070

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description, pages , as originally filed,
pages 1-6, filed with the demand,
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages 7, filed with the demand, (WITH AMENDED CLAIMS 1 & 2)
pages , received on with the letter of
- ☒ the drawings, pages , as originally filed,
pages 1-5, filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/AU03/00338

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 1-6	YES
	Claims	NO
Inventive step (IS)	Claims 1-6	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-6	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)**NOVELTY (N) and INVENTIVE STEP (IS)****A. The documents constituting the closest prior art are :**

- (i) AU 200035386 B
- (ii) GB 2308566 A
- (iii) EP 428462 A

B The subject matter of claim 1 differs from these prior art in that the support adaptor assembly has a means for supporting objects in suspension above the support members of the bearing press. Once the parts are separated the adaptor assembly will support one part and support members of the bearing press will support the other.

C. The distinguishing features of the invention will facilitate the assembly and disassembly of press fitted components.

D. Therefore the application satisfies the criteria set forth in PCT Article 33(2-3), concerning the novelty and inventive step of the independent claim 1.

E. The criteria concerning novelty and inventive step of claims 2-6 are satisfied because these claims are dependent on claim 1.

INDUSTRIAL APPLICABILITY (IA)

The invention defined in claims 1-6 satisfies the criterion set forth in PCT Article 33(4).